

# research management *findings*

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## Home Range Characteristics of Eastern Wild Turkey Gobblers in Wisconsin's Driftless Region

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### Introduction

The Wisconsin Department of Natural Resources (DNR) accomplished restoration of eastern wild turkeys (*Meleagris gallopavo silvestris*) to Wisconsin during 1976-93. We studied the ecology of an established wild turkey population in Vernon County during 1987-94. A major objective of our research was to estimate gobbler survival using radio-telemetry. This study presented an opportunity to also collect home range data from the radio-marked gobblers. In this paper, we present estimates of seasonal and annual home range size of wild turkey gobblers in southwestern Wisconsin. In addition, we report spring dispersal movements and seasonal range associations.

### Study Area and Methods

The study area, Management Zone 1A, was established in 1987 and encompassed 455 km<sup>2</sup> of the Bad Axe River watershed in western Vernon County (Fig. 1). Typical of the unglaciated landscape in southwestern Wisconsin, the "Driftless Region" was extensively dissected by stream drainages, creating its rugged character. Oak/hickory (*Quercus/Carya*) woodlands comprised nearly half of the land area and the remaining land cover was a mixture of cropland, pasture, and idle areas. Dairy farming was the primary land use in the study area. Most tillable acreage was planted to rotations of corn, alfalfa, and oats as forage for the dairy operations. During the study, winter population density averaged approximately 8 birds/km<sup>2</sup> of woodland (Kubisiak et al. 1997).

Gobblers were captured during winters 1990-91, 1991-92, and 1992-93 using rocket net boxes (Wunz 1987). For the home range analyses, gobblers  $\geq 2$  years old were classified as adults and 1-2 year old gobblers were classified as yearlings. Backpack transmitters were attached to

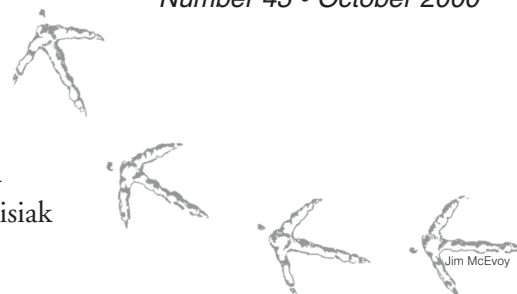
gobblers using 3.2-mm elastic cord. Gobblers also were marked with aluminum wing and leg bands. Gobbler locations were obtained approximately 2 times/week by triangulation ( $\geq 3$  azimuths) using vehicle-mounted, null-peak systems. Reference radios were used to maintain telemetry quality.

We estimated seasonal and annual home range size using the modified minimum polygon method (Harvey and Barbour 1965) and the program TELEM (Koeln 1980). Seasons were defined as spring (March - May), spring hunt (April - May), summer (June - August), fall (September - November), and winter (December - February). We believe these periods encompassed the biologically significant events during the year. Only birds that were monitored for  $\geq 3$  seasons were used to estimate annual home range size (Wigley et al. 1986). We used analysis of variance to test age and season effects on home range size. To examine seasonal shifts in home range use, we determined the percentage of overlap between seasons ( $n = 5$ ); spring-to-summer, summer-to-fall, fall-to-winter, and winter-to-spring. Spatial data were analyzed with a geographical information system (GIS) using ARC/INFO software. Statistical significance was accepted at  $P < 0.05$ .

Spring dispersal movements of radio-marked gobblers were estimated by measuring linear distances from the center of winter home ranges to the first telemetry location obtained in April. Spring dispersal distances also were calculated from leg-banded gobblers that were harvested during spring hunts in 1991-93. Only direct recoveries were used in this second analysis.

### Results and Discussion

We obtained 1,074 locations from 17 radio-marked gobblers (11 adults and 6 yearlings) to estimate seasonal and

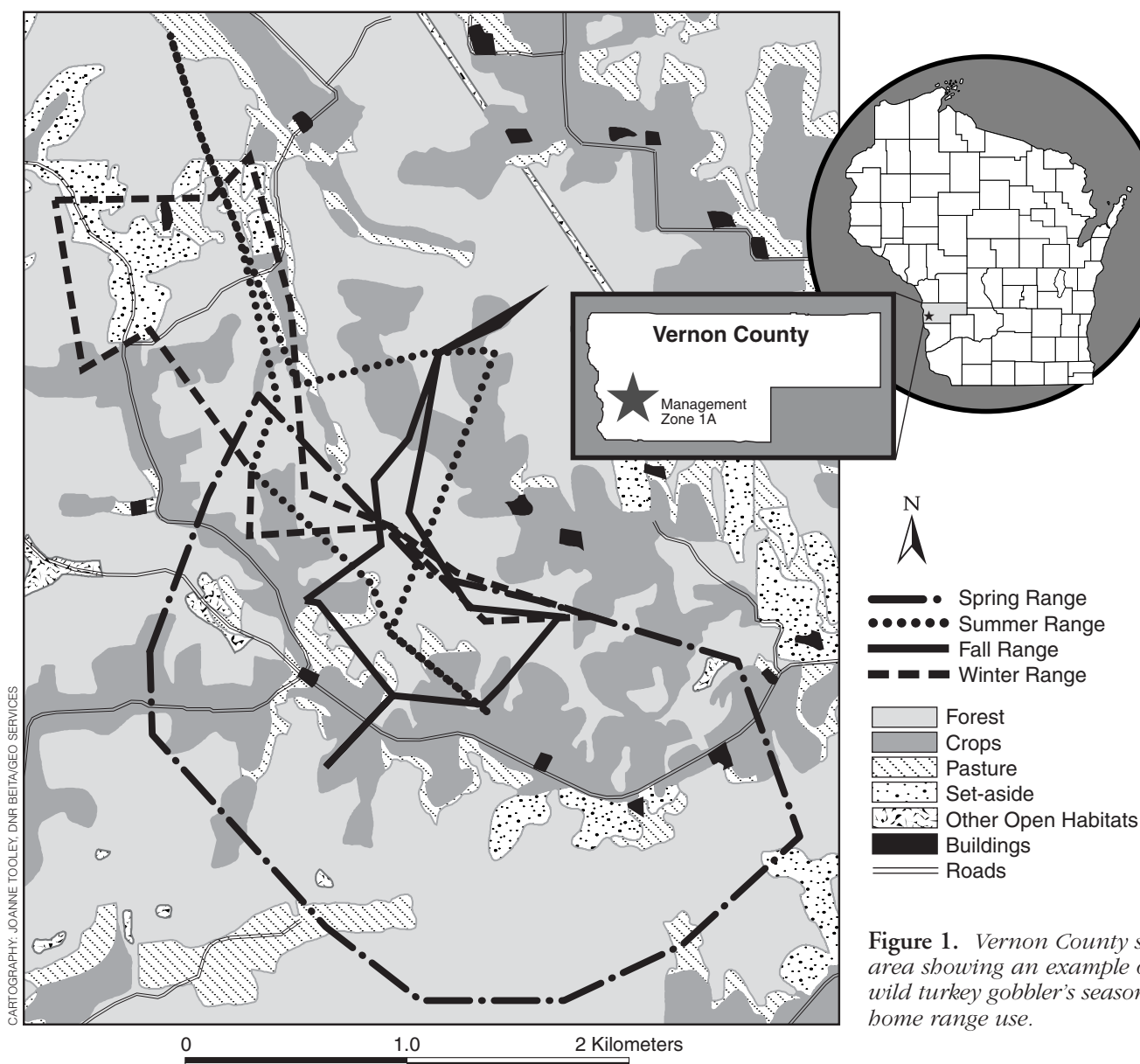


annual home range size. The number of locations used to calculate individual seasonal home range size averaged 22. Maintaining individuals in the sample (for multiple-year data) was difficult due to relatively high mortality rates during the study (~ 50% annual mortality [Paisley et al. 1996]). Age-specific comparison of home range size was limited to fall 1992 due to insufficient data for yearlings during other periods. We did not detect an age-specific difference in fall home range size ( $F_{1,9} = 4.03$ ,  $P = 0.08$ ) and ages were pooled for subsequent analyses.

**Seasonal home range.** Spring home ranges averaged 201 ha (range = 18 - 425 ha) (Table 1) and were significantly larger than the other seasons during 1991 ( $F_{4,14} = 11.82$ ,  $P = 0.0002$ ). Home range size for the spring hunt period was about 1/2 the size of the total spring season

home range size. Spring dispersal substantially increased spring home range size. The greatest dispersal movements occurred during late March and early April. Porter (1978) also documented significant increases in home range size during spring for wild turkeys in southeastern Minnesota. During his study, gobblers traveled long distances (5-8 km) between relatively small areas (10 ha) that they would use for several days and then move back across the home range. Porter (1978) conservatively estimated that some spring home ranges approached 2000 ha.

As breeding behavior waned in early June, gobbler movements were greatly reduced. A diverse landscape with an abundant food supply lessened the need to travel great distances to locate food resources. Summer



home range size averaged only 54 ha (range = 36 - 74 ha). Our estimates were lower than those reported in southeastern Minnesota (Porter 1977). For this population, home range sizes averaged over 500 ha during June, but this was followed by a sharp reduction in movements (< 200 ha) during July and August.

Fall is a transition period for turkeys. As the availability of food resources changes, turkeys take advantage of favored wild foods, such as acorns, wild grapes, and the fruits of gray dogwood and Virginia creeper (Paisley and Kubisiak 1994). Recently harvested cornfields also provide important foraging sites. Fall home ranges for gobblers averaged 70 ha (range = 13 - 137 ha).

**Table 1.** Seasonal and annual home range sizes (ha) of radio-marked wild turkey gobblers in Vernon County, Wisconsin, 1991-93.

Season <sup>a</sup>	1991			1992			1993			All Years		
	n <sup>b</sup>	Mean	SE	n	Mean	SE	n	Mean	SE	n	Mean	SE
Spring	5	302	54	3	113	67	8	171	38	16	201	32
Spring Hunt	5	143	9	—	—	—	4	89	25	9	119	15
Summer	3	50	10	—	—	—	3	59	9	6	54	7
Fall	3	47	8	11	76	13	—	—	—	14	70	11
Winter	3	40	19	2	79	21	8	85	23	13	74	16
Annual <sup>c</sup>	—	—	—	—	—	—	—	—	—	13	625	60

<sup>a</sup> Spring = Mar.-May; Spring Hunt = Apr.-May; Summer = Jun.-Aug.; Fall = Sept.-Nov.; Winter = Dec.-Feb.

<sup>b</sup> Number of gobblers.

<sup>c</sup> Calculated only if 3-4 seasonal home range estimates were available.

Winter home range size averaged 74 ha (range = 10 - 228 ha). Winter conditions were generally moderate during our study and did not restrict gobbler movements for long periods. The exception to this occurred during winter 1990-91, when deep snow (>22 cm) persisted for 43 days. Turkey movements became very restricted and gobbler home ranges averaged only 40 ha. Turkeys often remain on roost until mid-day during severe winter periods and spend much of the non-roost period loafing to conserve energy until foraging conditions improve. Similar findings have been reported for other northern wild turkey populations. In southeastern Minnesota, home ranges of adult gobblers increased from 100 ha in November to 288 ha in December and sharply decreased during January-March averaging < 23 ha each month (Porter 1977). During this severe winter (1974-75), snow depths exceeded 32 cm in February and much of March. Crim (1981) also observed small home ranges during periods of deep snow and cold temperatures for an Iowa population.

**Annual home range.** Mean annual home range size was 625 ha and varied considerably among 13 radio-marked gobblers (range = 264 - 1022 ha) (Table 1). The existing literature on the spatial dynamics of wild turkeys also indicates highly variable home range sizes (Brown 1980). Ellis and Lewis (1967) reported an average annual home range size of 440 ha for radio-marked gobblers in the Missouri Ozarks. Annual home range size for heavily forested areas in the southern part of the wild turkey's range averaged 393 ha in Alabama (Barwick and Speake 1973) and 1,680 ha in Mississippi (Kelley et al. 1988).

**Spring dispersal movements.** The average distance moved by radio-marked gobblers was approximately 1.6 km ( $n = 13$ ,  $SE = 0.30$ ), with a range of 0.5 - 3.7 km. Only 2 gobblers moved over 3.0 km. In our second analysis, dispersal of leg-banded gobblers from winter capture site to harvest location averaged 2.4 km ( $SE = 0.37$ ) for 33 gobblers. Maximum distances moved were 8.6 km for yearlings and 7.3 km for adults. In Alabama, Barwick and Speake (1973) also reported linear spring dispersal distances for gobblers averaged 2.4 km, while spring movements of gobblers in the Missouri Ozarks averaged approximately 2.0 km (Ellis and Lewis 1967).

**Seasonal range associations.** The percentage of home range overlap between seasonal ranges averaged 2% (spring-to-summer), 27% (summer-to-fall), 22% (fall-to-winter) and 33% (winter-to-spring). A relatively low percentage of overlap ( $\leq 33\%$ ) between seasons suggested that shifts in home range use occur during the year. Although seasonal shifts in home range use were observed, examination of composite home range maps revealed a relatively close association of summer, fall, and winter home ranges (Fig. 1). This association may be explained by the interspersed forest, field, and agricultural habitats within the study area, which likely reduced the need to travel great distances to satisfy life history requirements.

## Summary

Home range size of wild turkey gobblers in southwestern Wisconsin varied considerably and was larger in spring than in other seasons. Spring dispersal movements (during March and early April) contributed substantially to spring home range size. Summer, fall, and winter home ranges tended to be closely associated which probably reflects the high quality habitat of the study area. Understanding the spatial requirements of wild turkeys is important to developing appropriate habitat management plans. The estimates presented here are intended to provide resource managers with additional perspective for managing wild turkey populations.

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